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MSTV

ASSOCIATION FOR MAXIMUM SERVICE TELEVISION, INC.

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Vice President and General Counsel

July 25, 1994

BY MESSENGER

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Re: Joint Request for Clarification in ET Doc **90-314** JUL 25 1994

Dear Mr. Caton:

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

Transmitted herewith is an original and ten copies of a Joint Request for Clarification prepared by the Association for Maximum Service Television, Inc. ("MSTV") on behalf of itself and eight other entities in the television broadcast industry including Capital Cities/ABC, Inc., CBS Inc., Fox, Inc. & Fox Broadcasting Stations, Inc., the National Association of Broadcasters, National Broadcasting Company, Inc., Public Broadcasting Service, the Radio-Television News Directors Association, and the Society of Broadcast Engineers.

Kindly direct any questions regarding this Request for Clarification to the undersigned.

Sincerely,

Julian Shepard
Julian L. Shepard

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JUL 25 1994

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of

Amendment of the Commission's Rules
to Establish New Personal
Communications Services

)
)
) Gen. Docket No. 90-314
) RM-7140, RM-7175,
) RM-7618
)
)

JOINT REQUEST FOR CLARIFICATION

ASSOCIATION FOR MAXIMUM
SERVICE TELEVISION, INC.

CAPITAL CITIES/ABC, INC.

CBS INC.

FOX, INC. & FOX BROAD-
CASTING STATIONS, INC.

NATIONAL ASSOCIATION OF
BROADCASTERS

NATIONAL BROADCASTING
COMPANY, INC.

PUBLIC BROADCASTING
SERVICE

RADIO-TELEVISION NEWS
DIRECTORS ASSOCIATION

SOCIETY OF BROADCAST
ENGINEERS, INC.

July 25, 1994

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JOINT REQUEST FOR CLARIFICATION

The Association for Maximum Service Television, Inc. ("MSTV"), and Capital Cities/ABC, Inc.; CBS Inc.; FOX, Inc. & Fox Broadcasting Stations, Inc.; the National Association of Broadcasters; National Broadcasting Company, Inc.; Public Broadcasting Service; the Radio-Television News Directors Association ("RTNDA"); and the Society of Broadcast Engineers, Inc. ("SBE") (the "Joint Parties")^{1/} hereby request clarification by the Commission of its Memorandum Opinion and Order ("MO&O") released

^{1/} MSTV is a non-profit trade association of local broadcast television stations committed to achieving and maintaining the highest technical quality for the American television broadcasting system. NAB is a non-profit, incorporated association of radio and television stations and networks which serves and represents the American broadcast industry. RTNDA is a non-profit association of local and network news executives, educators, students and others devoted exclusively to electronic journalism. SBE is the national association of broadcast engineers and technical communications professionals, and supports a volunteer group of over 100 broadcast auxiliary frequency coordinators. The other Joint Parties include major television broadcasting networks. MSTV, NAB, RTNDA, SBE and the other Joint Parties all have a longstanding and vital interest in maintaining the viability of free, universal, over-the-air television broadcasting, and are deeply concerned about the need for continued uninterrupted access to sufficient auxiliary broadcast spectrum.

June 13, 1994, in this proceeding.^{2/} MSTV and the Joint Parties do not oppose the allocation of spectrum to Personal Communications Services ("PCS") and Mobile Satellite Services ("MSS") as a general matter, and are supportive of the Commission's efforts to achieve the greatest benefits for the public in allocating radio-frequency spectrum. However, without the clarifications sought by MSTV and the Joint Parties, certain aspects of the MO&O could have a significant adverse impact on the daily operations of virtually every broadcast television station in the country. It is essential that sufficient interference-free broadcast auxiliary spectrum be maintained for current and future use in providing news and information to the public via the free, universal, locally-based television broadcasting system.

I. INTRODUCTION & SUMMARY

Faced with a number of Petitions for Reconsideration of the Third Report and Order in this proceeding,^{3/} the Commission decided two issues on reconsideration that have significant implications for the interests of MSTV and the Joint Parties. First, the Commission decided to increase the maximum permissible power of PCS base stations from a previous maximum of 100 watts E.I.R.P., to 1640 watts E.I.R.P.^{4/} MO&O at ¶¶ 166-174. In

^{2/} Memorandum Opinion and Order, Gen. Docket No. 90-314, FCC 94-144, released June 13, 1994.

^{3/} Third Report and Order, Gen. Docket No. 90-314, 9 F.C.C. Rcd. 1337 (1994), appeal pending sub. nom. Pacific Bell v. FCC, No. 94-1148 (D.C. Cir., filed March 1, 1994).

^{4/} The Commission simultaneously has limited the transmitter output power to 100 watts, and adopted a sliding scale for

revising the base station power emissions limit, the Commission did not take account of the potential for interference to broadcast auxiliary users in the upper adjacent band (1990-2110 MHz), perhaps because the Commission adopted the revised PCS band plan simultaneously on reconsideration.

Second, the Commission decided to allocate to PCS a portion of the spectrum internationally designated for MSS. MO&O at ¶¶ 94-97. Under this allocation scheme, the entire allocation to broadband PCS is now located in the 1850-1990 MHz band. The Commission returned the 2180-2200 MHz band -- which was allocated to PCS previously -- to reserve status for future allocation. In so doing, the Commission removed spectrum from consideration for MSS in the band 1970-1990 MHz, 10 MHz of which could have been used for Region II MSS service. In addition, by shifting the PCS allocation out of the 2180-2200 MHz band, the Commission preserved the option of allocating some or all of that spectrum to MSS in the future -- in theory, to create closer correspondence with international agreements by preserving 50 MHz of the 60 MHz allocated worldwide.

A significant portion of the international MSS spectrum, 20 MHz, overlaps with spectrum in the lower portion of the current domestic broadcast auxiliary band, 1990-2010 MHz in the 1990-2110 MHz band. The Commission noted that this 20 MHz portion of the broadcast auxiliary band potentially could be reallocated for MSS use on a shared basis, "if feasible, or

antenna height (HAAT) and E.I.R.P. limits. MO&O at ¶ 173, and Appendix A, p. 20, Rule § 24.232.

exclusively, if suitable replacement spectrum could be found for broadcast auxiliary service." MO&O at ¶ 97. Moreover, the Commission expressed its intent to initiate a proceeding to investigate allocation possibilities for accommodating MSS operations within the remaining internationally designated bands, while at the same time maintaining sufficient spectrum for broadcast auxiliary use. Id.

As MSTV and many of the Joint Parties have stated elsewhere, the broadcast auxiliary bands are intensively used, particularly the 1990-2110 MHz band which is utilized primarily for Electronic News Gathering ("ENG") operations by local stations, networks and some cable news organizations.^{5/} ENG plays a vital and indispensable role in delivering coverage of both local and national news events to the American public. The intensity of use and demand for spectrum for ENG operations is increasing each year. As the record of this proceeding reflects, shared use of this spectrum with other services such as MSS is not feasible for technical reasons as well as those associated with over-crowding.

^{5/} See E. Cohen, Television Auxiliary Frequencies Usage Surveys, 6-7 (1989) (attached to NAB's Oct. 1, 1990 Comments, ET Docket No. 90-314); Comments of Capital Cities/ABC, Engineering Statement of Kenneth Brown, Gen. Docket No. 90-314 (Oct. 1, 1990); Comments of Cox Broadcasting and Multimedia, Inc., Gen. Docket No. 90-314 (Oct. 1, 1990); Comments of H & C Communications, Inc., Gen. Docket No. 90-314 (Oct. 1, 1990). See also Reply Comments of MSTV, ET Docket No. 93-198, at 3-4 (July 29, 1993); Reply Comments of MSTV, Gen. Docket No. 89-554, at 3-4 (Jan. 8, 1991).

Accordingly, MSTV and the Joint Parties hereby respectfully request clarification by the Commission that: (1) the Commission will explore and address the serious implications of placing PCS operations at significantly higher power emission levels in spectrum adjacent to the broadcast auxiliary band; (2) in future proceedings the Commission will place a very high priority on finding a suitable spectrum solution for MSS that does not involve relocation or impairment of broadcast auxiliary operations such as ENG; (3) if auxiliary broadcast operations are to be relocated, the Commission will first provide broadcasters with suitable alternate frequencies, with propagation characteristics similar to the 1990-2110 MHz band, that provide adequate spectrum to alleviate the congestion broadcasters now face in major markets and to accommodate the rapid and steady annual growth rate; and (4) if auxiliary broadcast operations are to be relocated, the Commission will adopt adequate measures, in advance of any order requiring relocation, to ensure sufficient time for a transition to avoid disruption of broadcast auxiliary operations such as ENG, to ensure the costs of clearing the spectrum in which broadcast auxiliary users are to be relocated are not borne by broadcasters, and to require compensation of broadcasters for the full amount of their relocation costs.^{6/}

^{6/} In this regard, the Commission should be guided by the procedures established in ET Docket No. 92-9. See Redevelopment of Spectrum to Encourage Innovation in the Use of New Communications Technologies, Final Report and Order, ET Docket No. 92-9, 9 F.C.C. Rcd. 1943 (1994); Third Report and Order, ET Docket No. 92-9, 8 F.C.C. Rcd. 6589, 6591, 6603-04 (1993); Second Report and Order, ET Docket No. 92-9, 8 F.C.C. Rcd. 6495, 6499-6511 (1992); First Report and Order, ET Docket No. 92-9, 7 F.C.C.

II. THE COMMISSION SHOULD CREATE A GUARD BAND TO PREVENT INTERFERENCE BETWEEN BROADCAST AUXILIARY USE OF THE 1990-2110 MHz BAND AND PCS USE OF THE LOWER ADJACENT BAND

The MO&O fails to address the issue of potential interference from PCS base station transmissions in the annexed frequencies (1970-1990 MHz) to broadcast auxiliary operations in the upper adjacent band (1990-2110 MHz). In adopting the new PCS band plan, the Commission appears simply to have assumed that either these adjacency problems do not exist, or they would be cured by some subsequent action involving relocation of broadcast auxiliary operations. Nevertheless, the Commission did take into account the impact of increased power limits for PCS base stations on unlicensed PCS devices, and refused to increase the power of PCS subscriber units for fear of the impact it might have on other users of the spectrum. MO&O at ¶¶ 172-174. However, it is clear that the current rules would result in disruption and harmful interference by PCS base stations emitting up to 1640 watts E.I.R.P. to broadcast auxiliary uses such as mobile ENG unless precautions are taken.

Therefore, MSTV and the Joint Parties request that the Commission clarify its intent to prevent this type of inter-service interference through preventative measures. Adoption of a guard band of adequate width in the upper portion of the 1970-1990 MHz band would be the most effective method of protecting broadcast auxiliary operations in the 1990-2110 MHz band from PCS base station emissions. A guard band of this type also would

serve to protect PCS operations, especially subscriber units, from receiving interference from broadcast auxiliary operations.

If a guard band is not adopted, it is conceivable that the entire 2 GHz broadcast auxiliary band would suffer harmful interference. As the attached Engineering Statement of Dane E. Ericksen, P.E. ("Ericksen Engineering Statement") prepared on behalf of SBE indicates, there is a strong potential for "brute force" overload by PCS base station transmissions throughout the entire 1990-2110 MHz band, not just on the lower adjacent broadcast auxiliary channels. This concern is corroborated by information obtained from Microwave Radio Corporation, a leading manufacturer of broadcast auxiliary equipment. According to Microwave Radio, "without a healthy guard band, most or all existing ENG receive systems will be rendered useless by the presence of a local PCS station." See July 15, 1994 Letter of C. Guastaferro, Microwave Radio Corporation (attached to the Ericksen Engineering Statement).

The provision of a guard band as a preventative safeguard is the best solution to this interference problem. Such an approach would be far more effective than other alternate treatments, such as inter-service frequency coordination, which requires advance planning and entails the likelihood of disputes requiring Commission supervision or resolution. Moreover, adoption of a guard band would prevent interference problems before PCS operations cause disruption and harm to broadcast auxiliary operations. Because broadcast auxiliary use of the 1990-2110 MHz band is primarily ENG and mobile "point-of-view"

uses, it would not be feasible to rely on inter-service frequency coordination. Mobile news gathering typically involves spur-of-the-moment responses and rapid decision-making regarding frequency selection on the part of ENG crews. Moreover, in most of the larger markets, ENG operations are already burdened by the need for intense intra-service frequency coordination.

III. BROADCAST AUXILIARY SPECTRUM IN THE 1990-2110 MHz BAND WOULD BE A POOR CHOICE FOR ACCOMMODATION OF MSS

The 1990-2110 MHz band, currently allocated to broadcast auxiliary use, is shared on a co-primary basis by local stations, broadcast network mobile and auxiliary operations, and cable television relay users. 47 C.F.R. § 74.602(a). It supports both fixed and mobile services.^{1/} Increased reliance on broadcast auxiliary operations (and on ENG in particular) to enhance service to the public has resulted in intense congestion, especially in major metropolitan areas. A 1993 study conducted by the staff of the Institute for Telecommunications Sciences determined the "band is already crowded in many major markets" and, "since it [the 1990-2110 MHz band] is the band most preferred for ENG, it is likely that continuing growth of ENG

^{1/} Fixed applications include studio-to-transmitter links, inter-city relays, and links between remote satellite receive sites and transmitters. Temporary fixed and mobile applications include electronic news gathering equipment located typically in vans, airplanes, or helicopters that are equipped to feed live programming while on location. ENG units use steerable antennas to relay live programming to the television station while in operation. Mobile applications also include equipment mounted on people and objects in motion such as skiers and race cars, to relay "point-of-view" pictures which are in great demand by TV viewers. These are low power units which usually must be received at nearby temporary receive sites.

will take place . . . " R. Matheson & K. Steele, A Preliminary Look at Spectrum Requirements for the Fixed Services, 40-41, ITS Staff Study, U.S. Department of Commerce, National Telecommunications and Information Administration (May, 1993).^{8/} The ITS study estimated the future annual growth rate to be approximately 15 percent for the next five years. Id. at 41.

News -- national and local -- is a very important component of broadcast television's service to the public; the ability of local broadcasters to cover live stories at the scene provides a key service to audiences in times of crisis, and significantly enhances the local nature of broadcast television. The same is true for the role of ENG activities in network news, which has become a great leveler of geographic distance between local audiences and fast-breaking news events nationally and internationally. However, the ability of local and network news providers to render live or remote coverage of events is inextricably related to the availability and quality of spectrum available for auxiliary and ENG operations.

Faced with a record indicating that sharing between MSS and the broadcast auxiliary service would not be feasible, the

^{8/} The record of this proceeding is replete with evidence of the intensity of use and crowding of the broadcast auxiliary band. See E. Cohen, Television Auxiliary Frequencies Usage Surveys, 6-7 (1989) (attached to NAB's Oct. 1, 1990 Comments, ET Docket No. 90-314); Comments of Capital Cities/ABC, Engineering Statement of Kenneth Brown, Gen. Docket No. 90-314 (Oct. 1, 1990); Comments of Cox Broadcasting and Multimedia, Inc., Gen. Docket No. 90-314 (Oct. 1, 1990); Comments of H & C Communications, Inc., Gen. Docket No. 90-314 (Oct. 1, 1990). See also Reply Comments of MSTV, ET Docket No. 93-198, at 3-4 (July 29, 1993); Reply Comments of MSTV, Gen. Docket No. 89-554, at 3-4 (Jan. 8, 1991).

Commission appears to have revisited its initial decision to exclude the broadcast auxiliary band from consideration for shared use by emerging technologies. MO&O at ¶ 97. Clearly, the information assembled by the Commission in this proceeding unequivocally indicates that such sharing would not be feasible. A spectrum study conducted by the Commission's Office of Engineering and Technology in 1992 determined that broadcast auxiliary spectrum in the 1990-2110 MHz band then supported approximately 2000 fixed and 5500 mobile facilities, which were capable of coexisting only by "extensive coordination between licensees." See "Creating New Technology Bands for Emerging Telecommunications Technology," FCC/OET TS92-1 (January, 1992), 9-10 ("OET Study").

Moreover, based on the OET Study, the Commission concluded that "it [was] not practicable . . . to relocate the broadcast auxiliary" service. Notice of Proposed Rule Making, ET Docket 90-314, 7 F.C.C. Rcd. 1542, 1544 (1992). More recently, the Commission noted that MSS interests opposed the expansion of the PCS proceeding to include the possible allocation of the 1990-2010 MHz band to MSS, arguing that the current allocation of this band to broadcast auxiliary operations is necessary, that these frequencies are already congested and that there currently is no evidence that sharing between broadcast auxiliary operations and MSS would be feasible.^{2/} MO&O at ¶ 93.

^{2/} The Commission attributes this position to American Mobile Satellite Corporation (AMSC). Subsequently, AMSC stated, "It appears impossible for MSS service links to share with Broadcast Auxiliary mainly due to interference that could occur

In light of the infeasibility of sharing broadcast auxiliary spectrum, and the fact that the Commission concluded it is not practical to require relocation of broadcast auxiliary service users, the Commission should place a very high priority on exploration of other spectrum possibilities for MSS. These possibilities include those raised in the Petition for Reconsideration filed by Celsat, Inc. on July 5, 1994, in this proceeding ("Celsat Petition") -- advocating the value and advantages of a secondary allocation for domestic MSS in the 1970-1990 MHz band. According to Celsat, ". . . there would be no interference to the PCS [subscriber units] from MSS satellite transmissions." Celsat Petition at 4. As for potential interference from MSS mobile transmission received at PCS base stations, Celsat asserts that its MSS technology is capable of preventing the assignment of a potentially interfering channel to an MSS mobile user whenever it is within range of an incumbent fixed microwave or PCS system. Id. at 5.

IV. IF AUXILIARY BROADCAST USERS ARE TO BE RELOCATED TO PROVIDE SPECTRUM FOR MSS, ADEQUATE NEW SPECTRUM MUST BE FOUND AND EQUITABLE PROCEDURES FOR COMPENSATION WITH A TIMETABLE FOR A NON-DISRUPTIVE TRANSITION SHOULD BE ADOPTED IN ADVANCE.

MSTV and the Joint Parties sincerely believe that the Commission can find a spectrum solution for MSS that does not involve either sharing of the broadcast auxiliary band, or

to Broadcast Auxiliary, particularly since many events that trigger high local congestion of Broadcast Auxiliary channels for ENG also would trigger high local demand for MSS." See AMSC Comments, IC Docket No. 94-31, July 15, 1994, Technical Appendix, p. 7.

relocation of broadcast auxiliary users to another band. However, if ultimately the Commission decides to relocate broadcast auxiliary users, a number of significant factors must be taken into account to achieve a fair and equitable result. The Commission should include all of the important ingredients in crafting a transition plan to ensure that broadcast auxiliary users and the public they serve do not become victims of a relocation scheme that results in significant disruption or displacement.

First, adequate replacement 2 GHz spectrum must be allocated to broadcast auxiliary service to accommodate current and future broadcast auxiliary uses, before broadcasters are required to vacate their current allocation. The characteristics of the new band must be suitable for ENG and mobile point-of-view applications, as well as longer hauls for inter-city relays and studio-to-transmitter links. In this regard, the Commission has estimated the average path length for fixed services to be 30.4 miles, with a range from 1 to 100 miles. OET Study, at 10. Also, the replacement spectrum must continue to support "building bounce" techniques and must be completely cleared of all other uses of the spectrum that could be hindered by such operations.^{10/}

Second, the amount of replacement spectrum to be allocated for broadcast auxiliary use should be adequate to

^{10/} "Building bounce" techniques are used to overcome blocked paths during news coverage in major cities. This technique does not work at higher frequencies above 2 GHz. See Engineering Statement of Kenneth J. Brown in Comments of Capital Cities/ABC, Inc., ET Docket No. 92-9, June 5, 1992.

satisfy existing NTSC needs, the growth forecast for the NTSC auxiliary service, and the future auxiliary broadcasting needs of Advanced Television (ATV) operations. Broadcasters will require at least as much spectrum as is now available in the 1990-2110 MHz band to satisfy current and future NTSC auxiliary uses. ATV needs will require substantially more spectrum.^{11/}

While there has been some wide-eyed speculation that substantial amounts of fixed auxiliary broadcasting uses can be shifted to fiber-optic cable transmission technology, thereby freeing spectrum for mobile ENG use, the belief that these gains will be substantial, especially in light of the rapid growth rate in auxiliary broadcast use, is dubious at best. There is absolutely no evidence that such efficiencies are likely to result, and the extent of such theoretical efficiencies is not yet known for broadcast auxiliary applications. For good reasons, the clear trend has been one favoring utilization of wireless technologies. Installation of fiber-optic links is not routinely available to rural transmitter or ENG relay sites, and maintainability is not assured at mountaintop transmitter or ENG relay sites, many of which are subject to earth movement and/or severe precipitation which hazard cable runs of any kind.^{12/}

^{11/} See MSTV Comments, ET Docket No. 94-32, June 15, 1994 (Inquiry on Allocation of Spectrum Below 5 GHz Transferred from Federal Govt Use). See also Reply Comments of NAB, and Capital Cities/ABC, Inc., ET Docket No. 94-32, June 30, 1994.

^{12/} For example, when the Southern California Frequency Coordinating Committee recently investigated the possibility of establishing a fiber-optic cable link from the Hollywood area to Mt. Wilson, Bellcor (one of the major providers of such links)

Moreover, even though fiber-optic paths are being phased in where practical, history suggests that some redundancy of communications links will be necessary, involving the continued maintenance of wireless communications facilities for critical point-to-point applications to ensure continuity of service to the public, particularly in times of emergency.^{13/}

The Commission also has noted that industry groups are currently pursuing research into video digital compression systems. According to the OET Study, several video compression systems have been demonstrated that can transmit two to four video signals within a single NTSC channel bandwidth. While this technology may offer some potential for improving the spectrum efficiency of fixed operations in the future, the embedded investment in analog equipment is substantial and such state-of-the-art digitally compressed equipment is not widely available. Moreover, in the considered opinion of the National All Industry Advisory Council on Part 74 Coordination Matters, this technology will neither be ready for implementation in the near future, nor will it be cost-effective as an ENG solution when (or if) it is

quoted a cost of \$200,000 just to conduct a feasibility study. See SBE Reply Comments, ET Docket No. 92-9, July 6, 1992.

^{13/} Excessive dependence on common carrier circuits (including fiber) could be counter productive. ". . . when AT&T loses enough circuits to shut down all New York airports, it would be nice to have some assurance we would still be on the air to report the story." Engineering Statement of Kenneth J. Brown, Comments of Capital Cities/ABC, Inc., ET Docket No. 92-9, June 15, 1992.

ready.^{14/} See SBE Reply Comments, ET Docket No. 92-9, July 6, 1992, at 2.

Third, a key ingredient of an equitable transition plan would be a requirement that all relocation costs be borne by the entities seeking to clear spectrum for MSS operations and that the transition be guided by a timetable that ensures no disruption of existing service. Reasonable costs of relocation would include all legal, engineering, labor, equipment, site costs, and FCC fees associated with both the relocation of broadcast auxiliary users and the clearing of the band in which they would be relocated. Moreover, the costs would include the administration of the relocation/compensation process, and development of a suitable plan for the new band.

Indeed, there is precedent for such a relocation/compensation plan. When the Commission recently reallocated spectrum in the 1850-1990 MHz band from microwave operations to PCS, a detailed transition plan was adopted which addressed both compensation of incumbent licensees and the timetable for relocation. Third Report and Order, ET Docket No. 92-9, 8 F.C.C. Rcd. 6589 (1993) ("Emerging Technologies Third Report"). In that context, the Commission mandated a three-year "transition period" for licensed PCS operations to achieve the relocation of incumbent microwave users -- a period in which the incumbent cannot be forced to move, but may agree to move after

^{14/} Extensive analytical support for this conclusion may be found in the Engineering Statement of Kenneth J. Brown, Comments of Capital Cities/ABC, Inc., ET Docket No. 92-9, June 15, 1992.

negotiations with the PCS licensee.^{15/} Id. at 6589-90, 6594-95. Significantly, in that context the Commission resolved the issue of spectrum for relocation, before requiring any move by incumbents. The Commission had previously reallocated to the incumbent users spectrum in the rechannelized 4, 6, 10, and 11 GHz bands. Second Report and Order, ET Docket No. 92-9, 8 F.C.C. Rcd. 6495, 6499-6511 (1992).

Any relocation/compensation procedures adopted for emerging technology services must be adapted to the unique challenges of relocating the existing broadcast auxiliary service; thus, MSS's obligations also would include identifying and obtaining, on the broadcast auxiliary users' behalf, new frequencies or other facilities where applicable. No incumbent broadcast auxiliary user should be required to move until "comparable alternative facilities" are available to it for a sufficient time to make adjustments and ensure a seamless handoff.

V. CONCLUSION

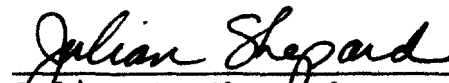
Broadcast auxiliary spectrum is vital to the free, universal, locally-based television service Americans have become accustomed to receiving. The Commission's recent decisions in this proceeding raise a number of significant questions regarding how PCS operations will peacefully coexist with auxiliary broadcasting uses, and how the Commission will provide spectrum

^{15/} It is likely that the broadcast auxiliary users would require a longer period for a transition, at least five years.

to MSS. MSTV and the Joint Parties request clarification of the points raised above to ensure that broadcast auxiliary needs will continue to receive the highest priority by the Commission that they so rightfully deserve. MSTV and the Joint Parties are certain that the Commission can continue to provide emerging technologies with sufficient spectrum, without reducing the spectrum available for, or deteriorating the quality of, the broadcast auxiliary service.

Respectfully submitted,

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ATTACHMENT

Joint Request for Clarification: General Docket 90-314

Statement of Dane E. Ericksen, Consulting Engineer

I am Chairman of the SBE FCC Liaison Committee, and I serve on the SBE Board of Directors and on the SBE Executive Committee. I am a registered professional engineer in the State of California and I have worked for 14 years as a consulting engineer for the firm of Hammett & Edison, Inc., Consulting Engineers, located near San Francisco. I am SBE certified at the Senior Broadcast Engineer level, both Radio and Television. I hold a FCC General Radiotelephone Operator License, Number PG-12-14271, and Amateur Extra Class license N6AJY. I am familiar with broadcast industry microwave equipment practices and the FCC Rules governing allocation of stations in the microwave services and methods of calculating interference between microwave stations or systems. I am submitting this statement on behalf of SBE, in support of a Petition for Clarification to the June 13, 1994, Memorandum Opinion and Order to the above-captioned docket.

Brute Force Overload Threat to 2 GHz ENG Receive Sites

As documented in the attached Exhibit A, from Microwave Radio Corporation ("MRC"), a major manufacturer of 2 GHz Broadcast Auxiliary electronic news gathering ("ENG") microwave equipment, the threat to the 2 GHz ENG frequencies caused by uncoordinated high-powered Personal Communications Services ("PCS") base stations is primarily that of brute-force overload, and not out-of-band emissions. Out-of-band spurious emissions, although also a threat, are a secondary concern.

By far the best solution to the brute force overload threat would be a guard band of at least 20 MHz at the top of the PCS band. A guard band eliminates the need for frequency coordination, with all the administrative burdens that *cross-service* frequency coordination would create for *both* PCS and 2 GHz Broadcast Auxiliary users. Perhaps the easiest implementation of a guard band solution would be to simply require that high-powered PCS base stations only operate in the 1895–1910 MHz lower half of the PCS C block of frequencies, and allow only much lower powered PCS portable stations to operate in the 1975–1990 MHz upper half of the PCS C block of frequencies.

If the Commission decides not to adopt a guard band, the next best solution would be a requirement for PCS base station applicants to frequency coordinate with adjacent-band 2 GHz Broadcast Auxiliary users. For example, a requirement that a PCS base station could not be located within 2 kilometers of a 2 GHz Broadcast Auxiliary receive site would be an acceptable solution. Without an obligation for PCS licensees to frequency coordinate with the now immediately adjacent Broadcast Auxiliary band users, a high-powered PCS base station could be located at the same site that now supports an ENG receive site. Such sites typically employ

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either omnidirectional receiving antennas, or steerable directional receiving antennas. It is further common for these systems to employ a feedhorn-mounted low noise amplifier ("LNA"). Because the LNA is mounted in the feedhorn, there is no practical physical access before the LNA in which to insert a supplemental band pass filter or a PCS band notch filter. Even if it were possible to physically insert such additional filters, to protect the LNA from brute force overload, the insertion loss of the filter(s) would greatly diminish, and possibly completely eliminate, the benefit of the LNA. Of course, there is also the issue of the cost of such a filter, and who would be responsible for paying that cost.

So the brute force overload threat to ENG receivers is not just to receivers operation on Channels A-1 (1990–2008 MHz) or A-2 (2008–2025 MHz), but to the entire 2 GHz ENG band (Channels A-1 through A-7, or 1990–2110 MHz).

PCS Out-of-Band Emission Limitations Are Inadequate

The Commission's "strict out-of-band emissions limits" (MO&O, at Paragraph 190) as currently defined are inadequate. The formula adopted in Section 24.234(a) of the FCC Rules for PCS base stations would only require a maximum attenuation of -73 dBc, given that the maximum PCS base station transmitter power is 100 watts ($43 + 10\log_{10}(100 \text{ W}) = 73 \text{ dB}$). I submit that a -73 dBc out-of-band suppression requirement is hardly "strict."

What does this mean? Consider the following example applying to a maximum power PCS base station 100 meters (328 feet) away from an ENG receive site:

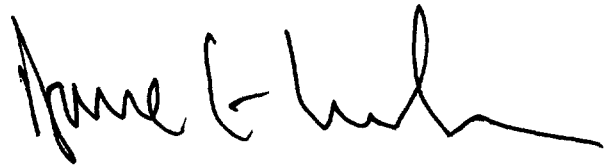
PCS base station EIRP	62.1	dBm (1640 W)
out-of-band suppression	-73	dB
free space path loss, 100 meters	-79	dB
ENG RX antenna gain	20	dB
off-axis rejection	0	dB
PCS spurious signal level at LNA input	-69.9	dBm

Thus, the level of a PCS out-of-band spurious signal from a maximum-power PCS base station, with the minimum required out-of-band suppression, would be more than 15 dB above the receiver's lower dynamic range of -85 dBm! Since this signal would be on-channel to the frequency the ENG receiver is designed to tune, an ENG bandpass or highpass filter, or a PCS notch filter, no matter how "heroic," would not be effective.

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In order to ensure that out-of-band PCS emissions (which could constitute *in-band* interfering signals to 2 GHz Broadcast Auxiliary receivers) are not a threat, those signals should be 10 dB below the receiver's effective threshold, or, in this case, -95 dBm. This represents another 25.1 dB of suppression, or, in terms of free space path loss, 18 times further than the 100-meter distance hypothesized above. Thus, a separation distance of 1800 meters, or, in round numbers, 2 kilometers, would be a reasonable separation distance requirement for a high-powered PCS base station to have to provide any fixed 2 GHz ENG receive site. A lesser separation distance might be appropriate for PCS base stations that are less than 1.64 kW EIRP, or when the 2 GHz Broadcast Auxiliary receiver is a fixed-link STL or ICR path, and the benefit of a directional receiving antenna with a permanent orientation applies. However, such cases would have to be calculated on a case-by-case basis. If a PCS base station proponent does not wish to do so, then the default minimum spacing of 2 kilometers should apply.

If the Commission elects to adopt a PCS out-of-band suppression requirement of, say, -100 dBc, I would agree that such a spurious signal suppression requirement could be characterized as "strict," and would greatly reduce the interference threat cause by spurious, out-of-band PCS emissions. But this would be of no help to an ENG receiver already made useless due to brute-force overload: the "patient" would already be dead.



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